HEAT EXCHANGER AND AIRFLOW THERETHROUGH

CLAIMS

What is claimed is:

1. A heat exchanger comprising:

a housing for enclosing a coil assembly therein;

said coil assembly partially defining in said housing on opposite sides of said coil a first airflow plenum and a second airflow plenum; and

a path of multi-directional airflow through said housing, said path of airflow comprising a first portion defining a cross flow distributed over a portion of said coil assembly beginning at one end of said housing and extending through said first airflow plenum in a first direction, a second portion defining a flow extending from said first airflow plenum in a second direction through said coil assembly, and a third portion defining a second cross flow distributed over a portion of said coil assembly through said second airflow plenum in said first direction to an opposite, end of said housing.

2. The heat exchanger of Claim 1 wherein said coil comprises a plurality of elongated segments and a plurality of bent end segments, said elongated segments and said bent end segments combined with one another to define a substantially serpentine-shaped coil, and said elongated segments in said interior of said housing oriented in substantially a transverse manner relative to said portions of airflow in said first direction.

3. The heat exchanger of Claim 1 wherein said coil assembly is oriented within said housing in an angular manner relative said airflow from said inlet in said first direction.

4. The heat exchanger of Claim 1 wherein said coil assembly is oriented within said housing in an angular manner relative said airflow from toward said outlet in said first direction.

5. The heat exchanger of Claim 1 wherein said coil assembly is oriented within said housing in an angular manner relative said airflow through said coil assembly in said second direction.

6. The heat exchanger of Claim 1 wherein said coil assembly is tilted within an interior of said housing such that said coil assembly is angularly misaligned with at least one of a top and bottom of said housing.

7. The heat exchanger of Claim 6 wherein said coil assembly is angularly misaligned with both said top and bottom of said housing.

8. The heat exchanger of Claim 6 wherein said coil assembly comprises a plurality of elongated segments and a plurality of bent end segments defining a single coil row extending through said housing, and wherein said interior is otherwise free of any other said coil rows in said housing.

9. The heat exchanger of Claim 1 wherein said housing comprises a top and bottom, two sides and two ends, for defining said interior, one of said ends at least partially defining said airflow inlet and the other of said ends at least partially defining said airflow outlet.

10. The heat exchanger of Claim 1 wherein said inlet communicates with said first airflow plenum and said second airflow plenum communicates with said outlet.

11. The heat exchanger of Claim 1 wherein said inlet and outlet are substantially rectangular in shape.

12. The heat exchanger of Claim 1 wherein said inlet and said outlet are substantially diagonal disposed in said housing relative to each other.

13. The heat exchanger of Claim 1 wherein said inlet and said outlet are disposed opposite one another on opposing ends of said housing.

14. The heat exchanger of Claim 1 wherein said inlet and said outlet each extend substantially the length L of said housing.

15. The heat exchanger of Claim 1 wherein said inlet is oriented closer to a top than a bottom of said housing and said outlet is oriented j closer to said bottom than said top of said housing.

16. The heat exchanger of Claim 1 wherein said airflow plenums are substantially prismatic.

17. The heat exchanger of Claim 1 wherein said airflow in said first direction and said airflow in said second direction are substantially perpendicular to one another.

18. The heat exchanger of Claim 1 wherein said airflow in said first direction defines a pair of horizontal portions of airflow and said airflow in said second direction defines a vertical portion of airflow.

19. The heat exchanger of Claim 1 wherein the cross-sectional area of said first airflow plenum diminishes as said air flow is distributed from said inlet and the cross-sectional area of said second airflow plenum increases as said airflow is distributed over said coil assembly toward said outlet.

20. An apparatus for controlled ripening of produce, comprising:

a heat exchanger having a housing for enclosing a coil assembly therein;

said coil assembly partially defining in said housing on opposite sides of said coil a first airflow plenum and a second airflow plenum; and

a path of multi-directional airflow through said housing, said path of airflow comprising a first portion defining a cross flow distributed over a portion of said coil assembly beginning at one end of said housing and extending through said first airflow plenum in a first direction, a second portion defining a flow extending from said first airflow plenum in a second direction through said coil assembly, and a third portion defining a second cross flow distributed over a portion of said coil assembly through said second airflow plenum in said first direction to an opposite end of said housing.

21. A method for transferring heat with a heat exchanger, said heat exchanger comprising a housing defining an interior, said housing having a coil assembly partially defining first and second airflow plenums in said housing, said method comprising the following steps:

receiving airflow into said first airflow plenum;

distributing said airflow in said first airflow plenum across a portion of said coil assembly in a first direction;

passing said airflow through said coil assembly in a second direction;

distributing said airflow in said second airflow plenum across a portion of said coil assembly in said first direction; and

exhausting said airflow from said second airflow plenum to the exterior of said housing.

22. The method of Claim 21 wherein said airflow in said first direction passes over elongated segments of said coil assembly in substantially a transverse manner.

23. The method of Claim 21 wherein said steps of distributing said airflow generates horizontal airflow and said step of passing said airflow through said coil assembly generates airflow substantially perpendicular to said horizontal airflow.

24. The method of Claim 21 further comprising the step of orienting said coil assembly in said interior of said housing such that the cross-sectional area of said first airflow plenum diminishes as said air flow is distributed from said inlet and the cross-sectional area of said second airflow plenum increases as said airflow is distributed over said coil assembly toward said exit.

25. The method of Claim 21 further comprising the step of passing airflow through said heat exchanger without passing refrigerant through said heat exchanger to cool said airflow and warming said airflow with a heater.

26. A refrigeration system comprising, in combination:

at least a pair of air movers coupled to one another;

at least a pair of evaporators coupled to said pair of air movers, one of said evaporators positioned on one side of said pair of air movers and another said air mover

positioned on an opposite side of said pair of air movers, said air movers oriented relative said evaporators to draw airflow through said evaporators, and each said evaporator comprising a housing for enclosing a coil assembly therein, said coil assembly tilted in an interior within said housing;

said coil assembly partially defining in said housing on opposite sides of said coil a first airflow plenum and a second airflow plenum; and

a path of multi-directional airflow through said housing, said path of airflow comprising a first portion defining a cross flow distributed over a portion of said coil assembly beginning at one end of said housing and extending through said first airflow plenum in a first direction, a second portion defining a flow extending from said first airflow plenum in a second direction through said coil assembly, and a third portion defining a second cross flow distributed over a portion of said coil assembly through said second airflow plenum in said first direction to an' opposite end of said housing.